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WITH ABSTRACT**

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**STEAM IRON WITH A PLASTIC SKIRT SURROUNDING****THE STEAM CHAMBER**

The present invention relates to steam pressing irons where  
5 water from a reservoir flows slowly into a steam chamber to  
there be vaporized in contact with a hot wall.

Steam pressing irons that are manufactured economically are  
known, such as that described in the patent FR2770856. Such  
irons have a soleplate having a heating body and a steam  
10 chamber, a reservoir having an upper part and a lower part.  
Advantageously, the lower part constitutes a heat shield which  
covers the soleplate, and constitutes also the cap or skirt of  
iron.

The soleplate has a hot body generally of cast aluminum and  
15 provided with a heating element. The pressing surface of the  
iron is at the lower part of the hot body, which can be  
covered or not by a plate presenting better ironing qualities.  
The hot body constitutes a steam chamber, generally closed at  
the upper part by a plate, as for example the patent FR2581571  
20 gives a description thereof.

However, from the patent FR2444108 irons are known whose steam  
chamber has a heated essentially flat lower face, the side  
walls surrounding the chamber being obtained by a stamped  
metal closing part, instead of a plate. But the ribs within  
25 the steam chamber come from the molded hot body, which does  
not make it possible to simplify the soleplate.

The document FR2372924 illustrates another construction of the  
steam chamber which is open toward the bottom of the iron, and  
closed by a plate that constitutes locally the ironing  
30 surface. The ribs necessary to the steam chamber extend from

a high horizontal wall of the heating body and are prolonged toward the bottom of the iron to the cover plate.

In addition the patent FR2770077 is known which describes a boiler for household electric appliances having a plastic body with a flat metal heating bottom provided with a heating element. But the plastic body of this boiler does not have several functions, which appreciably decreases the value of this realization.

Known irons require parts for closing the steam chamber and connection parts between the water reservoir and this chamber. Moreover, the structure does not permit the simple realization of steam irons whose soleplate is obtained starting from metal sheets, without brazing and without implementing heavy metal molding means.

The goal of the invention is to mitigate these disadvantages in order to produce an economical iron.

The goal of the invention is achieved by a steam iron having a heating soleplate, a steam chamber, a part having multiple functions constituting at the same time a heat shield and the skirt of the iron, characterized in that the part having multiple functions constitutes at least in part the steam chamber above the soleplate.

Thanks to this original construction, the number of parts of the iron is reduced and assembly facilitated.

Preferably, the steam iron has a water reservoir, and the part with multiple functions constitutes the bottom of the water reservoir.

There is no joint that connects a part of the reservoir to a part of the steam chamber, nor a cover plate, and reliability is increased. The ribs of the steam chamber can extend from

the part having multiple functions and the simplified soleplate, which permits simple use, in an economical iron, of flat heating elements.

Preferably, the part having multiple functions is of heat resistant plastic.

This part locally accessible by the user can be hot. It presents a low conductivity and diffusivity, which make its contact not very dangerous with the skin. Plastic molding allows complex forms that facilitate assembly and fixation.

Preferably the plastic of the multifunction part is a polyester or a polysulfone.

In one version, the skirt of the iron constitutes the walls of the steam chamber.

The quantity of matter necessary for fabrication is then minimal. Thanks to a weak diffusivity, lower than  $1000 \text{ W m}^{-2} \text{ } ^\circ\text{C}^{-1} \text{ s}^{1/2}$ , of the plastic material, the contact temperature with the skin is low, and is not dangerous for the user.

Preferably the multifunction part is in contact with the soleplate through elastomer foam seals.

The joint then has a maximum flexibility which allows a good adaptation to the differences in dilation. The foam is deposited and adheres on one of the parts to be joined. It is polymerized before assembly. Feet or screws maintain the parts pressed together, by compressing the foam. Owing to the fact that foam presents only a very low hardness it adapts well to imperfections of surface and flatness without requiring a too intensive clamping which would be incompatible with the strength of the parts.

The foam can be obtained in two ways. One can mix in a distribution tube two components that foam and polymerize at

the outlet of the tube. Such foaming products are provided for example by the Wacker company. One can also mix a product known for its sealing qualities, such as a silicone, with a gas such as nitrogen in an appropriate mixer, for example a mixer of the Nordson or Dopag trademark, and distribute it on one of the parts to be joined. Polymerization is more quickly obtained by a later heating.

Advantageously, the joint between the upper and lower parts of the reservoir is of the same nature.

The invention will be better understood in view of the examples hereafter and of the annexed drawings.

Figure 1 is a longitudinal cross-sectional view in a vertical plane of a first iron according to the invention.

Figure 2 is a partial view in longitudinal cross section in a vertical plane of a second iron according to the invention.

Figure 3 is a partial view in longitudinal cross section in a vertical plane of a third iron according to the invention.

Figure 4 is a half view from the top in cross section in a horizontal plane H of the iron of figure 3.

Figure 5 is a partial view in longitudinal cross section in a vertical plane of a fourth iron according to the invention.

Figure 6 is a half view from the top in cross section in a horizontal plane H of the iron of figure 5.

In a first preferential version of the invention visible in figure 1 steam iron 1 comprises a soleplate 2, a steam chamber 3, a water reservoir 4 and a body 5 including a handle. A drip device 6 controls the passage of water contained in reservoir 4 toward steam chamber 3. An electromechanical thermostat 7 ensures thermal regulation of the iron.

Soleplate 2 has a heating body 21 of aluminum provided with a tubular heating element 211, and a plate 22 of aluminum or stainless steel assembled mechanically and thermally under heating body 21, plate 22 being intended to be in contact with the linen to be ironed. The soleplate has a primarily plane form which has, at the interior side of the iron, only the contours necessary for the coating of heat element 211 and some attachments not represented. The upper face 212 of heating body 21 constitutes a hot wall of steam chamber 3, against which water coming from drip device 6 is vaporized. This wall can comprise in the chamber an anti-calcification coating.

Reservoir 4 for water to be vaporized has an upper part 41 and a lower part 8 with multiple functions, of heat and moisture resistant polyester, forming the bottom of reservoir 4. The two parts 41, 8 are assembled by a joint 42 of silicone foam deposited in grooves in the upper part of part 8.

Multifunction part 8 constitutes at the same time as the bottom of reservoir 4, the upper wall of chamber 3 for vaporization of water and distribution of the steam towards holes of outlet 23. Toward the bottom of part 8 a peripheral rib 81, coming from said part 8 and extending to the soleplate, limits this steam chamber laterally. Other ribs 82, 83 disposed in a similar manner ensure the insulation of the thermostat with respect to the steam as well as the baffles necessary to for the steam circuit. Grooves are provided in the bottom of ribs 81, 82, 83 facing soleplate 2 and retain joints such as 84 of silicone foam, adhering to part 8. Attachment pieces not represented clamp parts 41, 8, and soleplate 2 against one another by compressing all the joints, which ensures the sealing between the parts.

The part 8 with multiple functions constitutes also visible skirt 85 between body 5 and soleplate 2 of iron.

It is seen that this design allows a very simple construction of the iron, without a conduit between the reservoir and the steam chamber, and with a soleplate having only few interior contours. Construction is economical, thanks to the multiple functions of part 8 which encloses the steam chamber.

In a second similar version, visible in figure 2 with the same references for similar parts, soleplate 2 has a flat heating element 211 similar to a heating element described in the patent FR2580887. Heating circuit 211 is between a lower plate 213 and an upper plate 212 of aluminum. Pins not represented are soldered, or welded, onto upper plate 212 to allow the clamping of parts 8 and 41 against the soleplate. A cap composed of a plate 22 of aluminum or stainless steel is assembled mechanically and thermally under lower plate 213, plate 22 being intended to be in contact with the linen to be ironed. The upper face of plate 212 transfers its heat to water coming from a drip device 6 and evaporates it. The steam produced is contained and directed towards the vapor holes 23 by part 8 similar to that of the first version.

Thanks to this part 8 with multiple functions the use of a flat heating element in a steam iron is facilitated.

Advantageously, the thermostat can be an electronic thermostat as in the third version represented in figures 3 and 4. Part 8 supports thermostat sensor 71 by means of a spring 72 which maintains it under pressure against soleplate 2, in order to ensure a good thermal contact.

Figures 5 and 6 represent a fourth similar version, in which part 8 has walls 86 serving simultaneously as the wall for steam chamber 3 and the wall for the skirt of iron. This

provision economizes the constituent material of part 8 and allows a very economical construction of the iron.